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Nutrition and Health

How does atherosclerosis (hardening of the arteries) begin? Scientists are closer to answering that question after finding that cells in blood vessel walls can produce a substance that promotes clotting and turns normally smooth arterial walls into "fly paper" for white blood cells. The substance, interleukin-1, was thought to be produced only by certain white blood cells. But, using recombinant DNA techniques, scientists found that the cells lining blood vessels and the adjacent smooth muscle cells, begin producing interleukin-1 when irritated by toxins. The next question is whether dietary fats and cholesterol also trigger production of interleukin-1.

Human Nutrition Research Center on Aging,
Boston, MA

Peter Libby, (617) 956-0393

The mainstream of U.S. elderly are generally well nourished despite their waning appetites. A survey of nearly 700 healthy Boston-area residents over 60 showed that their blood levels of essential vitamins and minerals were within normal ranges, although they consumed 200 to 400 fewer calories a day than middle-aged people. The adequate nutritional levels were due to wise dietary choices and the use of vitamin/mineral supplements by 50% of those surveyed. The study is the first to establish norms for healthy middle-class people throughout the aging process. More data is needed on minorities and low-income groups. (See enclosed release.)

Human Nutrition Research Center on Aging,
Boston, MA

Robert McGandy, (617) 956-0314/

Stuart Hartz, (617) 956-0313

Vive la différence! is getting a new translation as nutrition studies suggest it's the difference that keeps one sex long-lived. Most studies are done on male animals and men to eliminate the variable of hormone fluctuations, but scientists may be making a big mistake by generalizing from these studies for both sexes. Female rats, for example, survived copper deficiency experiments that killed 40% to 70% of their male counterparts from ruptured hearts in 8 weeks. Female rats reportedly survive a year on such copper-deficient diets. This is the first scientific evidence that an animal's sex can protect against heart-related death. (See enclosed release.)

Vitamin and Mineral Nutrition Lab,
Beltsville Human Nutrition Research
Center, Beltsville, MD
Meira Fields, (301) 344-2422

A low-calorie diet without exercise puts women at risk of losing lean tissue as well as fat, according to a strictly controlled study of moderately overweight young women. A no-exercise group ate 1,200 calories a day but lost no more fat than another group of women who consumed 1,800 calories a day but exercised actively. The 1,200 calorie group lost more total weight than the high-calorie group, but this was attributed to loss of body water and wasting muscle tissue. The findings stress that weight loss programs should be evaluated in terms of their effects on overall health and fitness of dieters.

Western Human Nutrition Research Center,
San Francisco, CA
Amy Belko, (415) 556-5695

Calcium supplement sales are booming as women try to protect themselves against brittle bones, or osteoporosis. But it's still not clear whether the pills are

effective over the long term. A 5-year study of 360 women is now under way to resolve the question for women past menopause. In a preliminary 7-month study, postmenopausal women, whose daily calcium intake from all sources was half or less the Recommended Dietary Allowance, lost spinal bone at a significantly greater rate than women whose intake exceeded the 800-milligram RDA.

Human Nutrition Research Center on Aging,
Boston, MA

Bess Dawson-Hughes, (617) 956-0415

Vitamin A supplements may be a bad idea for the elderly. A preliminary study showed that vitamin A, unlike most nutrients, is absorbed better by the elderly than by younger people. But it is not cleared from the blood as quickly--suggesting that older people who regularly supplement may be risking toxicity. Those who took a supplement had in their blood three to four times more of a vitamin A compound that signals danger of toxicity than those who did not. The finding could lead to a vitamin A recommendation tailored for senior citizens.

Human Nutrition Research Center on Aging,
Boston, MA

Robert M. Russell, (617) 956-0300

For the first time, scientists can "watch" the liver convert dietary sugars into a host of chemicals that transport hormones and nutrients, detoxify drugs, store the body's fuel and perform other essential functions. In the new technique, scientists feed isotope-labeled sugars to animals or humans, then flush the labeled products from the body with acetaminophen (the main ingredient in Tylenol and other analgesics) so they can be identified and measured. This is a rapid, accurate, harmless and painless way to study the chemistry behind conditions like diabetes and obesity, the inflammatory response to infection and, indirectly, the conversion of sugars to fats.

Human Nutrition Research Center on Aging,
Boston, MA

Marc K. Hellerstein, (617) 956-0402

Calorie counters may be getting fewer calories in their diets than they think, according to preliminary findings. USDA food tables--the primary references for food composition--report calorie content in terms of energy the body can use. The method of calculating this figure was developed around the turn of the century, but the food supply has changed since then. Are the calculated numbers still accurate? In a recent study, 12 men consumed ordinary foods in a mixed diet for 12 weeks. Direct measurement of the available energy in the diet averaged 5 percent below the calculated values. The discrepancy will be tested further using a human calorimeter, a chamber that measures the heat from a person's metabolism of food.

Energy and Protein Nutrition Lab,
Beltsville Human Nutrition Research
Center, Beltsville, MD

Carolyn Miles, (301) 344-2127

Vitamin K, essential for blood clotting, can now be detected in tiny amounts. The new method could lead to a Recommended Dietary Allowance and will help answer unresolved questions about clotting and bleeding disorders, such as how to balance vitamin K intake with anticlotting drugs. Because the new method is faster and far more sensitive than previous ones, its developers have already established normal fasting blood levels of the vitamin. These levels are about 1,000 times lower than those for vitamins A and E. Scientists will also be able to look at the body's absorption of the vitamin from foods and study its metabolism.

Human Nutrition Research Center on Aging,
Boston, MA

James A. Sadowski, (617) 956-0337/

Yacoub Haroon, (617) 956-0367

Another curse of aging, a rat study shows, is that it retards the ability to retrieve fats from storage for ready energy. But endurance exercise reverses this trend. Older rats that were subjected to 60 minutes on the treadmill each day were able to mobilize and burn more fat from their fat pads than the ones that ran or waddled for only 10 minutes. During

exercise, the 60-minute group had higher levels of epinephrine--a stress hormone also known as adrenaline--which may have accounted for the increased capacity of their muscles to burn fat.

Human Nutrition Research Center on Aging,
Boston, MA

Carol N. Meredith, (617) 956-0334

Look for stable isotopes--nonradioactive variations of nature's elements--to cause their own explosion in nutrition research for children. Scientists are now using heavy forms of carbon, hydrogen and oxygen as tracers to determine if and how nutrients are digested, absorbed and used; to estimate infants' body fat or energy expenditure as they grow; and to track the body's synthesis and breakdown of its own chemicals. Stable isotopes are especially suited for infants and children because they are harmless and the tests are quick, easy, painless and accurate.

Children's Nutrition Research Center,
Houston, TX

Peter Klein, (713) 799-6000

Tomorrow's Foods

Widespread tests with a "super carrot" in Nepal, Bangladesh, central Africa and elsewhere will reveal whether it can adapt to diverse climates and soils. The Beta III carrot, packing 10 times the carotene of standard varieties native to those areas, could supply much more vitamin A. Lack of this vitamin in millions of children in developing countries often leads to blindness or death. Agency scientists in the United States are working with Beta III germplasm so breeders here can produce hybrids with improved flavor as well as high carotene levels.

Vegetable Crops Research, Madison, WI
C.E. Peterson, (608) 262-1830

A tasty, nutritious new food--a custard-like dessert--is made from nonfat dry milk, rice flour, and sugar mixed with food gums and a little vegetable oil. The instant product has no eggs and no cholesterol and is easily digested. The gums

provide valuable fiber. A commercial food processor could make the product with artificial sweeteners for the calorie conscious and with lactase-treated nonfat dry milk for the lactose intolerant.

(PATENT)

Food and Feed Research, Southern Research
Center, New Orleans, LA

Ranjit S. Kadan, (504) 589-7088

Explosion puffed blueberries are being processed commercially by a Georgia company that has built a plant to use the technology. ARS scientists introduced the technology to the Georgia Blueberries Association and evaluated berries before and after processing to ensure their quality. Originally developed by the ARS research centers in Albany, Calif., and Philadelphia, Pa., to dry fruits and vegetables, explosion puffing retains the berries' natural flavor and texture and allows them to be easily rehydrated. The industry estimates that they will process about 1-million pounds of berries annually. (PATENT)

Field and Horticultural Crops, Athens, GA
Gerald Dull, (404) 546-3320

A new iceberg lettuce resistant to big vein--a major disease of this crop--has been developed and given to seed companies. Named Pacific, the lettuce is suited for the Salinas and Imperial Valleys of California, where 40% of the nation's lettuce crop is grown and where big vein is the second-worst disease. Big vein causes an unattractive crisscrossing of white or pale yellow veins in lettuce leaves, can prevent normal lettuce heads from forming, or can delay growth. Of the three lettuces that ARS researchers have developed so far to counteract big vein, Pacific is the most resistant.

Vegetable Production Research Lab, U.S.
Agricultural Research Station,
Salinas, CA

E.J. Ryder, (408) 443-2253

An ARS-developed technique to steam pecans before shelling is being used commercially by a plant in Madill, Oklahoma. Compared with the existing practice, the new tech-

nique increases from 75% to 90% the number of unbroken half-kernels, reduces from 12 hours to 3 minutes the time it takes to do the shelling and leaves nuts cleaner. Field & Horticultural Crops, Athens, GA William R. Forbus, (404) 546-3131

Adding a popcornlike aroma to unscented American rice might sell more of this surplus commodity at home and overseas. People of many countries prefer rice with a natural popcorn scent not found in most American rice varieties. Scented varieties cost more, yield less, and may be harder to grow than fragrance-free rice. But with a little more research and development, a fragrance-imparting chemical could soon be added to unscented domestic rice during milling. This enhancement of domestic rice could boost the current \$665 million export market for U.S. rice, especially to the Middle East and Asia.

Food Quality Research, Western Research Center, Albany, CA
Ronald G. Buttery, (415) 486-3322

Food Safety and Freshness

New treatments are being developed to control enzymatic browning of fresh or lightly processed fruits and vegetables. The research has taken on a new urgency since sulfites were banned by the Food and Drug Administration last July on raw produce because a number of people with asthma are allergic to the chemical. Safe and promising replacements for sulfites include combinations of stabilized reducing agents, chelating agents and enzymes inhibitors. Several treatments are based upon novel approaches to the problem of browning.

Plant Science Research, Philadelphia, PA
Gerald M. Sapers, (215) 233-6417

New wraps for individual fruits and vegetables help them stay fresh longer than current cling-type wraps or plastic bags. The new wraps shrink when heated and fit tightly around each fruit or vegetable, keeping moisture in and air out. In

tests, polyethylene or copolymer wraps reduced shriveling and maintained freshness of cucumbers, eggplants, peppers and tomatoes for 3 weeks longer than current packaging. The new wraps, most effective where refrigeration is scarce or where the growing season is short, cost only an extra penny or two an item.

Horticultural Research Lab, Orlando, FL
Lawrence A. Risse, (305) 897-7326

Strawberries shipped in Styrofoam containers had half the bruises and decay of those shipped in the plastic mesh containers now used--results that interest Florida shipping companies. Comparison tests by ARS included a 200 mile, 4-1/2 hour truck ride. The plastic mesh ribs tended to cut into berry skins, while the foam made a smooth cushion. Tests also showed the berries stayed as cool in vented foam containers as in mesh packages.

Horticultural Research Lab, Orlando, FL
William R. Miller, (305) 898-6791

Dill seed, lemon peel oil, and black pepper contain compounds that act as nature's own protection against insects. Chemicals in dill seed oil repel confused flour beetles, the most abundant and injurious pest in flour mills in the United States. A chemical in lemon peel oil repels cowpea and rice weevils, two other stored grain pests. And black pepper contains chemicals that kill most stored-product insects. These chemicals may lead to new commercial controls for these and other insects.

Stored-Product Insects Research and Development Lab, Savannah, GA
Helen C. Su, (912) 233-7981

Note to Editors: For further information or assistance, contact Judy McBride, Nutrition Editor, (301) 344-4095.